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UNITED STATES NAVY

MEDICAL NEWS LETTER

Vol. 41 Friday, 4 January 1963 No. 1

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HAPPY NEW YEAR TO ALL HANDS!

United States Navy

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Vol. 41 Friday, 4 January 1963 No. 1

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Active Management of Tetanus

Based on Experiences of an Anesthesiology Department

M. T. Jenkins MD*, and Nellie R. Luhn MD. * Anesthesiology 23:690-709, September - October 1962.

Tetanus is still an important and common disease. Regardless of the progress of our culture, we still have to live with Clostridium tetani. This organism seems to be everywhere, and it is a natural inhabitant of the intestinal tract of man and animal. Tetanus continues as a serious disease despite the availability of completely practical methods for its prevention and despite the use of improved serums and drugs in its treatment.

Incidence

In a recent report from Ceylon, 262 deaths were registered in a total of 908 cases for one year, a significant health problem for a country having a population of 8.5 million. In 1956, it was estimated that there were 150 to 200 cases in England and Wales per year where the population is approximately 44 million. In one year (1954), 37 patients in England died of tetanus. Denmark (population 4.5 million) reported 26 deaths due to tetanus (excluding tetanus neonatorum) in the years 1955 and 1956.

In a survey of the problem of tetanus in the United States, an annual morbidity rate of 0.43 cases per 100 thousand population was reported. In 1955, 462 cases were reported and 265 deaths registered in the United States. Although more favorable prognoses in tetanus have been shown in recent years, it is estimated that the death-case ratio remains about 60 deaths per 100 cases.

Despite this mortality rate, there are many reports of case series in which the mortality figure is lower. Morbidity, however, has probably been unaffected by advances in treatment, as noted by the complications occurring among those successfully treated. Christensen reported a mortality of 27% in 26 patients seen during 1945 - 1954 at the Mayo Clinic as compared to the rate of 57% for the decade ending in 1934. Pratt reviewed 56 cases of tetanus which were treated in the Infants' and Children's Hospitals, Boston, from 1924 to 1944, and reported a gross mortality rate of 43% (24 deaths).

Extensive experience in the treatment of tetanus has been gained at Charity Hospital in New Orleans. Vinnard noted a mortality of 45 % in 352 cases during the years 1934 - 1944 and Creech reported a mortality rate of 35% in 184 cases for the years 1944 - 1948.

Altemeier described the mortality in tetanus at the Cincinnati General Hospital, 1940 - 1946, as 65.1%, 29 deaths in 43 cases. Between 1947 - 1958,

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80 cases were seen in the same hospital, and the number of deaths was 17 (21.2%).

A survey of the number of cases of tetanus in the United States and the results of treatment is not feasible because reporting practices seem to vary among the states. Also, in assessing the death-case ratio, it is not possible to collect data from individual case reports, since means are not at hand to account for bias in selection of cases for publication. Although there are many individual case reports of a successful treatment of just one case and consequent advocation of that method of treatment for future cases, there must be many other one-case series resulting in mortalities which have not been published. Pratt points out that statistical studies dealing with large numbers of cases compiled from many different institutions have not been useful in evaluating the results produced by any given program of treatment. Valid opinion can be drawn only from large series of cases in which indices of the severity of the tetanus infection are made according to definite and acceptable criteria. In reports of single cases by different authors, there is no way to compare the severity of the initial infection. A value given for the severity of each case is necessary to assess the efficacy of innovations in treatment.

As an additional problem in comparing individual case reports of tetanus, the characteristics of different cultures of Cl. tetani and their spores may vary. The great variability in spore resistance, toxicity, serologic type, and strain is impressive. An awareness of these characteristics is necessary to understand some of the reported discrepancies regarding clinical variance, morbidity and mortality differences, as well as the differences of opinion and facts concerning the basic treatment.

This report enumerates the experiences of an anesthesiology department in sharing with the primary admitting services the responsibilities for treatment of tetanus. In the 10 years covered by this report there have been 62 cases in which this responsibility has been shared. There have been eight deaths in this series and a mortality rate of 12.9%. Twenty-five of these cases were at the Children's Medical Center, Dallas, and there were three deaths in this group. At Parkland Memorial Hospital, Dallas, there were 36 cases with with five deaths. An additional case of tetanus occurring with and incident to heroin addiction was successfully treated by the authors at another hospital. (During the time covered by this report there were 3 additional cases at Parkland Memorial Hospital which were not seen by members of the anesthesiology department. These resulted in three deaths, two due to reactions from tetanus antitoxin and the third subsequent to third degree burns. At the Children's Medical Center, one tetanus neonatorum died in the admitting division before being seen by the responsible services.)

Classification of severity of tetanus is given, based upon time from the onset of symptoms to definite episodes of generalized muscle spasms, the severity of the infection as judged by examination of the patient when first seen, and the frequency and severity of spasms or convulsions after sedation and the amount of sedation required. The incubation period was not used in judging severity because, in many cases, there was no history of injury nor could the

portal-of-entry be located. Also, the date of injury does not define the time at which the Cl. tetani spore germinated and produced toxins. Further, the possible incubation period was not used in prognosis, since the success of treatment seemed to depend more upon the time between the onset of symptoms and the beginning of treatment.

Those patients classified as mild were treated "expectantly" by intramuscular administration of barbiturates, parenteral alimentation, nonmutilative debridement of the wound site, tetanus antitoxin, antibiotics, and beginning active immunization with tetanus toxoid. They were maintained in a sedated but arousable status.

Tracheostomies were performed for those classified as moderately severe or severe, and the anticonvulsant drug used for the majority of children and adults was 0.4% thiopental by fractional intravenous drip. The desired level of sedation was one in which the patient would lie quietly without convulsions when undisturbed (but perhaps with evidence of increased tonus of muscles of the extremities). Upon stimulation, however, such as changing position, the patient should evidence extensor muscle contraction in his extremities and perhaps show a tendency to opisthotonos without interrupting his respiratory exchange. When stimulation did not evoke a definite response, the patient was considered too deeply sedated. He was too "lightly" sedated if he reacted to every stimulus with opisthotonos or convulsions.

Differences in airway maintenance and in anticonvulsant drugs used are noted for infants with tetanus neonatorum.

Perceptive nursing care is so important that specific and complete orders should be written. Examples of the authors' directions to nursing attendants are given.

Two patients are discussed who died from perforation of Cushing's ulcers. Three patients who survived had presumptive intercurrent diagnoses of peptic stress ulcerations because of tarry stools and/or the removal of old blood via gastric tube. This complication might be prevented by the administration of depressants of the reticular activating system and possibly adrenal suppressant drugs.

As others have reported, the writers found a high incidence of respiratory complications resulting from a change in the tracheal flora secondary to antibiotic treatment and abetted often by less than ideal care of tracheostomies. Meticulous asepsis should be required of all attendants and for all equipment used in tracheostomies. A tracheostomy cradle into which was directed a warm nebulized aerosol influenced favorably the management of the respiratory complications.

Other cases in which tetanus was a differential diagnosis included retropharyngeal abscess, abscess of a molar tooth, osteomyelitis of the mandible, strychnine poisoning, phenothiazine-induced shoulder girdle spasms, rabies, hypocalcemia, and tetanus antitoxin serum sickness whose manifest signs included temperomandibular arthralgia and trismus.

Despite the ubiquitous nature of the Cl. tetani spores, tetanus is a preventable disease, provided there is aseptic handling of the umbilical cord at birth followed by a program of active immunization with tetanus toxoid.

The reliability of prophylactic tetanus antitoxin is discussed: a small dose, 1500 to 3000 units, may prolong incubation time of the organism without preventing the development of tetanus, and may so sensitize the patient that therapeutic antitoxin required later may cause a sensitivity reaction. The neurological complications from tetanus antitoxin can be severe even if infrequent.

A plan of treatment is proposed for prevention of tetanus in the injured patient registering in the emergency room. This includes cleansing or non-mutilative debridement of the wound, tetanus toxoid, and an antibiotic regimen. Allergic responses to tetanus toxoid are rare, and they are mild when they do occur. The initial injection of toxoid does not produce a serum antitoxin level sufficient for minimal protection. The response to the second injection is tremendous, however, and is well above the minimal protective level.

Characteristics of the two Cl. tetani toxins, tetanolysin and neurolysin, and some bacteriological aspects of the organism are discussed. The organism does not grow in a clean wound but will proliferate only in the presence of an oxidation-reduction potential far lower than that in normal living tissue.

Anticonvulsant agents are compared, and suggestions given for possible modifications in the treatment of tetanus. Some challenging problems to be solved in the future are mentioned.

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The Histotoxic Clostridial Infections in Man *

John D. MacLennan **, Department of Microbiology and Tropical Medicine, Georgetown University Schools of Medicine and Dentistry, Washington, D. C.

The history of gas gangrene is too intricate, too diffuse, and too obscure to be dealt with within the compass of this review; nevertheless, for a clear understanding of current ideas on anaerobic infections in general and of gas gangrene in particular it is necessary to indicate in very general terms how knowledge of this group of diseases has developed.

Although descriptions of gangrenous infections with gas in the tissues are to be found scattered through the medical literature from the Middle Ages onward, it was not until modern times that so peculiar a condition began to attract attention or even to be considered as a disease sui generis. Because of this it has been frequently suggested that gas gangrene was almost unknown of old and has only recently become common. This is partly true, insofar as gas gangrene is primarily a disease of war; and war, in the last 150 years, has

* Research in preparation of this monograph was supported by a grant from the National Science Foundation. Publication was made possible by a grant from U. S. Army, Medical Research and Development Command, Office of The Surgeon General.

** Visiting Research Professor of Microbiology, deceased, June 4, 1962.

increased in scale and technical efficiency to a hitherto unknown degree. But it would be a grave error to regard gas gangrene as a new plague, peculiar to this age either in its incidence or its severity. There is a considerable mass of information to support this view which the author intends to set out elsewhere; for the present, apart from various earlier accounts, there are a whole series of coherent and recognizable descriptions of gas gangrene; in only a few of these is it spoken of as a new disease, although it is commonly referred to as a rare one. (Incidentally, it is perhaps worth pointing out that it is just those writers who have neglected or ignored the work of their predecessors who are now referred to so highly as the original "discoverers" of gas gangrene.) In 1871, Bottini, in an admirable and little known paper, clearly demonstrated the bacterial nature of the disease but failed to isolate a causal organism.

Coincidental with the growth of knowledge of gas gangrene, an essentially similar type of infection had also been recognized in domestic animals (particularly cattle) under the name of "blackleg," "symptomatic anthrax," "quarter evil," "Rauschbrand," and the like; and this in 1879 had been shown to be due to an anaerobic bacillus, subsequently named Bacterium chauvoei and, more recently, Clostridium feseri (now Clostridium chauvoei). This was, in fact, the first naturally occurring anaerobic infection to be identified as such.

To these two pathologic conditions—gas gangrene of man and blackleg of animals (whose similarity was as yet scarcely realized)—Koch, in 1881, added a third, malignant oedema. This infection, which had much in common with blackleg, was characterized by a blood-stained serous exudate and oedema (but not emphysema) of the involved tissues, and was caused by an organism, the "Oedembazillus," which Koch identified on very slender grounds with the anaerobic "Vibrion septique" of Pasteur. Malignant oedema, it must be emphasized, was originally a laboratory infection, experimentally induced; within a year, however, Brieger and Ehrlich had described two similar cases in man. These they believed to be unique, but shortly afterward Chauveau and Arloing, working in Lyons where both gas gangrene and blackleg had been continuously investigated over the previous 30 years, reported that gas gangrene and malignant oedema were one and the same disease and were caused by the anaerobic organism known variously as the Vibrion septique of Pasteur and the Oedembazillus of Koch.

So far as they went, these observations were undoubtedly correct and had they been more widely appreciated would have prevented much needless confusion. Unhappily, at this period, the bacterial specificity of disease was held as an almost inviolable principle, and with the rapid discovery of Clostridium perfringens, Clostridium novyi, and numerous other less reputable organisms in very similar infections, these earlier attempts at classification went by the board, and a period of fantastic confusion and contradiction commenced. The true nature of the anaerobic infections of man was ignored, forgotten, or misunderstood, and a wild multiplication of diseases and pathogenic agents resulted. Not only were gas gangrene, malignant oedema, and blackleg carefully described and meticulously differentiated as separate diseases of man, but various subtypes and transitional and intermediate forms of infection

were identified, and with them the most grotesque collection of so-called "species" of bacteria, both aerobic and anaerobic. During World War I, most of these fancies, fortunately, were swept away, although faint traces of the older superstitions still survive today, particularly, in the recognition of malignant oedema as a separate entity and in its careful differentiation from gas gangrene.

By 1919, however, it was generally believed that infections with C. chauvoei were peculiar to animals, that malignant oedema and gas gangrene were slightly different clinical manifestations of the same general type of infection, and that both might be caused by a wide variety of spore-bearing anaerobic bacilli of which C. perfringens, C. novyi, and Clostridium septicum (Vibrion septique) were the most important.

One further fundamental criterion had yet to be established. Although these anaerobic bacilli may infect almost any tissue of the body, the result of work in World War II has been to limit the term "gas gangrene" ("malignant oedema" is rarely used now of human infections) to those invasive anaerobic infections of muscle which are characterized by profound toxemia, extensive local oedema, massive death of tissue, and a variable degree of gas production. In this connection, the names "anaerobic myositis" and "clostridial myositis" suggested by MacLennan have received considerable acceptance. They are useful in that they stress the main site of the infection, but as Robb Smith has pointed out, are inaccurate in that the muscle lesion is necrotic rather than inflammatory. Accordingly, he has proposed the name "anaerobic (or clostridial) myonecrosis," a term which has much to recommend it despite its unfamiliar and unavoidably cumbrous ring. It is, however, unlikely that any of these new names will supplant the long established "gas gangrene."

Finally, it must be pointed out that this more rigid definition of gas gangrene has inevitably resulted in the recognition of other forms of gas infection, produced by anaerobic bacteria but distinct from gas gangrene. It will be necessary to consider in some detail these newly identified diseases, but before going on to the clinical aspect, consideration must be given in very general terms to the different organisms and pathologic processes involved.

The author believes it to be apparent from this review that the infections of man caused by histotoxic anaerobic bacteria are still among the most acute and lethal known. By far the most important are those associated with the Clostridia and these, in their turn, are more or less limited to infections of wounds. All degrees of involvement can occur, ranging from a simple contamination (which is very common, if not invariable) to a massive necrotizing and fatal disease of muscle (much more rare) to which the name of gas gangrene has been given.

The clostridia themselves are so widely distributed in nature that most wounds will be found to contain them, but the severer forms of anaerobic wound infection are largely limited to those sustained in war time or in major civilian catastrophes when the delay in primary treatment is immensely increased. Although many different clostridia have been identified, relatively few are truly histotoxic and of these, three species, Clostridium perfringens, Clostridium

novyi, and Clostridium septicum, are of overriding importance in human traumatic disease.

There is still a widespread impression that either the bacteriological demonstration of a toxigenic clostridium, such as Clostridium perfringens, or the presence of gas in a wound can justify the diagnosis of gas gangrene. Both beliefs are dangerously incorrect. It is, of course, true that because of the frequent occurrence of clostridia in wounds of all kinds, the diagnosis of gas gangrene is essentially a clinical problem which must be solved with speed and accuracy. However, the most significant features to be watched for in such cases are sudden severe pain in the affected part, local swelling and oedema, a profuse serohemorrhagic exudate, a rising pulse rate associated with increasing shock, and, at operation, certain peculiar changes in the infected muscles. Odor is neither so pronounced nor so typical as many of the standard descriptions in the literature would suggest; and gas (despite the common name of the disease) is rarely an obvious sign; indeed, it is almost invariably more marked in the lesser forms of clostridial wound infection, such as an anaerobic cellulitis.

Although there is some evidence that the early administration of polyvalent antitoxin can prevent or considerably delay the onset of the disease, such medication on a large scale is scarcely practicable or even desirable. There is, however, increasing justification for the belief that active immunization by means of toxoids can confer very considerable resistance against the severer forms of clostridial wound infection. This whole problem clearly merits immediate further study.

At the present moment, by far the most efficient procedure for both prophylaxis and therapy is almost entirely mechanical, i. e., radical surgical debridement accompanied by the administration of antibiotics (especially penicillin) both locally and parenterally and the intravenous administration of polyvalent antitoxin in massive doses. It may also be taken as axiomatic that every genuine case of gas gangrene will benefit from blood transfusion, frequently in enormous amounts.

The author emphasizes three points: (1) The extreme importance of early and accurate clinical diagnosis. (2) The essential nature of adequate surgical debridement. (3) The urgent need for the development of effective clostridial toxoids, particularly from Clostridium perfringens.

NOTE: This monumental article by Dr. MacLennan contains over 100 pages, including 1103 selected references to the literature. The original is highly recommended reading for military medical department personnel. The original article is broken down into sections entitled: Introduction, Bacteriology, Pathology and Pathogenesis, Clinical Considerations, Source and Relative Incidence of Pathogenic Clostridia, Incidence of Clostridial Infections, Diagnosis, Prophylaxis of Gas Gangrene, Treatment of Anaerobic Infections, General Conclusions, and Acknowledgements.

—Editor

RADIATION MEDICINE

ORIGINAL ARTICLE

TREATMENT OF INTERNALLY DEPOSITED RADIOACTIVE ISOTOPES

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Many materials in their stable forms cause no difficulty when introduced into the body and may even be essential for normal body functions. When these same elements are introduced in their radioactive form, one may expect a physiologic response of the tissue to the radiation. This response depends on many factors, such as:

1. THE AGE AND HEALTH OF THE PATIENT. A young person whose bones are forming will lay down a greater amount of an internally deposited radioactive bone-seeking element than will an elderly or debilitated person whose bones may be undergoing osteoporosis.
2. ROUTE OF ENTRY AND AMOUNT ENTERING. When swallowed, a material that is poorly absorbed through the intestinal wall may not cause trouble even in a relatively large amount, whereas a much smaller amount may cause trouble if accidentally injected under the skin.
3. PATTERN OF DISTRIBUTION AND RETENTION. Materials may be taken up selectively by different organs such as iodine by the thyroid and strontium by the bones.
4. METABOLISM OF THE TISSUE AND BIOLOGICAL HALF-LIFE. Some materials such as sodium, which is distributed throughout the body and is turned over readily, will have a much shorter biological half-life than a substance such as radium which becomes fixed in bone and is eliminated very slowly.
5. SUSCEPTIBILITY OF THE ORGAN WHERE LOCALIZED. Some tissues are more sensitive to radiation than others and as such are more easily damaged when a radioactive material localizes in or around them.
6. THE CHEMICAL AND PHYSICAL NATURE OF THE MATERIAL. Soluble materials may be absorbed through the lungs or through the gastrointestinal tract while insoluble materials are poorly absorbed. Insoluble 10 micron particles inhaled into the respiratory tract will be removed almost 100% while 1/2 micron particles will be largely absorbed into the body.
7. RADIATION CHARACTERISTICS OF THE MATERIAL. The alpha particle is much more destructive for a very short distance. Beta particles which, although not so destructive, will travel farther. The gamma ray can penetrate the whole organ or pass through the whole body.

TREATMENT

An isotope may be introduced into the body in the following ways:

1. Ingestion or entrance through any of the body orifices
2. Inhalation
3. Injection
4. Contamination of wounds
5. Percutaneous absorption

I. Oral Ingestion

As with any toxic agent swallowed, the important first step is to remove the material from the stomach. This may be done by causing vomiting by mechanical means such as putting the finger down the throat, or by an emetic. Following this a gastric lavage with a stomach pump may be necessary.

Absorption may be minimized by the use of precipitating agents to form insoluble precipitates. With elements that form insoluble hydroxides at physiological pH, the degree of absorption is small and raising the pH of the gastric juice with nonsystemic antacids such as aluminum hydroxide may further decrease absorption. With elements that form insoluble sulfates such as radium and strontium, the administration of magnesium sulfate and possibly antacids may be of value. Oxalate-containing foods such as spinach and rhubarb may be of value in treatment of ingestion of the rare earths.

The use of chelating agents immediately after oral ingestion may be unwise since the solubility of certain metals may be increased, thus increasing the amount that may be absorbed through the internal mucosa.

The toxic material may be hastened through the intestinal tract by the use of selected cathartics such as magnesium sulfate.

II. Inhalation

Insoluble or poorly absorbed particles are removed from the respiratory tract by the action of the cilia. The rate of movement by the cilia varies along the tract. In the bronchioles, movement is at a rate of 0.15 - 0.30 cm/minute, in the bronchi at 0.25 - 1.0 cm/minute, and in the trachea at 3 - 4 cm/minute. The larger particles are removed faster than the small ones. The number of particles not removed increases sharply as the particle size decreases below 1 micron. The smaller the particle the greater the relative surface area there is and the greater the tendency for the material to go into solution. Insoluble particles of one-half micron pass through the alveolar cells and into the blood stream. The inhalation of soluble forms of radioactive substances is almost equivalent to intravenous injection.

A suggested form of treatment for inhaled radioactive materials is as follows:

Wash the external nares. Then insert a nasal catheter into the nasopharynx and irrigate the nasal passage with isotonic saline with the patient's head flexed forward and his mouth open so that the solution runs out the nose and the mouth. (If the patient is allowed to sit up with his mouth closed, he is apt to swallow the irrigating solution.) Following the first wash, spray a vasoconstrictor such as 1/4% neosynephrine into the nose. It is believed that vasoconstriction may lessen absorption of soluble materials. Furthermore shrinking the mucous membrane will permit more thorough washing during subsequent irrigations. Continue irrigating until all removable radioactive material has been eliminated.

Expectorants may be given to aid in removal of the insoluble particles. Materials brought up from the lungs should be expectorated. Precipitating agents and gastric alkalizers should be given to lessen absorption of materials brought up by the cilia and swallowed. Cathartics may be of value in hastening the removal of any swallowed material.

III & IV. Injections and Wound Contamination

The first step is to remove the contaminating material by irrigating, debridement, or even block dissection. Soluble material that has been disseminated from the site must be dealt with by chelating agents or one of the treatments discussed later.

V. Percutaneous Absorption

Once a material has passed through the skin into the circulation it must be dealt with in the same manner as though it had been injected into the blood stream. No one treatment can be generally applied to poisoning by radioactive isotopes any more than one can be applied for drug or other chemical poisoning. Each case must be evaluated and treated individually.

Treatment after entry into the body is governed by time and means of entry. If a material that is poorly absorbed through the intestinal wall, such as plutonium, is swallowed, one would not wish to administer diethylenetriaminepentaacetic acid (DTPA) immediately. This would increase the solubility in the intestinal tract and result in greater absorption. However, if the plutonium were injected, the sooner the DTPA is given after local excision of the area, the greater the amount of excretion.

Following the introduction of a radioactive isotope into the body, one may be able to influence the amount retained in a critical organ by administering a stable isotope of the same material. Flooding the body with the stable isotope, or even a different one that competes with the radioactive substance in the metabolic process, will hasten its excretion from the body and diminish the amount of radiation to the critical organ. Stable iodine given soon after Iodine-131 has entered the body decreases the amount of radioactive iodine taken up by the thyroid. Large amounts of water will help in ridding the body of some of the H^3 following a tritium concentration.

Decalcification Therapy

Elements such as radium and strontium, that behave in the body like calcium, may be influenced by control of calcium metabolism. The chance of reducing the body burden is best in the early stages when the material is still in the soft tissue and more easily removed rather than later when it has become fixed in the bone. In acute radium and strontium exposure, decalcification therapy may prevent the deposition of a body burden in the bone. In chronic poisoning, the material is fixed in the dense cortical bone and this type of treatment is impractical since the net depletion is insignificant.

Decalcification is best accomplished by means of a low calcium diet and ammonium chloride. Thyroid and parathyroid therapy have been reported to increase the excretion of calcium. Cortisone in large doses stops bone metabolism and may decrease the amount of strontium or radium laid down if used in acute poisoning. Magnesium gluconate administration is believed to raise the excretion of radium in proportion to its effect on calcium excretion.

Complexing or Chelating Agents

Complexing or chelating agents have the capacity to bind metals in their structures and prevent them from undergoing the usual chemical reactions. If a metal-chelate formed in the body is insoluble and nondiffusible, the toxic effect of the metal ion is prevented from taking place in this bound state. With radioactive metals this type of chelate is of little value as far as the radiation effects are concerned, since the metal can still send off its emissions. If the chelate is water soluble and readily diffusible, the radio-

active metal bound in the chelate may be excreted in the urine and eliminated from the body.

BAL (2, 3-dimercaptopropanol), developed by the British to treat injuries from arsenical war gases, competes successfully for SH groups through the formation of chelates. The BAL-arsenic combination is readily excreted. In addition to arsenic BAL is used for mercury and bismuth poisoning. BAL also produces a marked increase in polonium excretion from the body.

BAL is administered intramuscularly, 2.5 mg/kg of body weight. The dose is repeated at 4-hour intervals for 4 to 6 injections on each of the first two days. The dose is then reduced to two injections daily for 10 days or until recovery.

Sodium citrate has been used to form citrate complexes with metals which can then be excreted in the urine. Sodium citrate, when given within two hours after an injection of plutonium, is able to raise the excretion of plutonium several fold. However, sodium citrate has some disadvantage as a complexing agent in that it is rapidly metabolized in the body.

Polyamino Acid chelating agents form strong chelates with polyvalent cations. The resulting chelates are water-soluble and un-ionized. DTPA, diethelenetriaminepentaacetic acid, has proved superior to EDTA, ethylenediaminetetraacetic acid, in its capacity to increase excretion of heavy metals. Considerably more stable complexes are formed with DTPA than with EDTA. Its toxicity is of the same order as EDTA. DTPA may be used orally but is more effective by the intravenous route. When it is administered intravenously, 1 gram in 250 cc of isotonic saline is given by slow drip. When used for more than a few days, 1 gm of DTPA may be given two or three times a week for three weeks followed by a rest period of three weeks. Where deposition of the radioactive substance exceeds the maximum permissible level by a large factor, doses of DTPA may be doubled or tripled initially. DTPA increases the rate of elimination of Pu^{239} in the urine by a factor of 45 to 120 times. Caution should be used with this drug in the presence of nephritis or other kidney pathology.

Ca EDTA is administered as an intravenous drip in 250-500 cc of isotonic saline or 5% glucose at a rate of not more than 0.5 gm per 30 lbs per hour. The total dose should be limited to 1 gm/30 lbs/day. The maximum weekly dose should be limited to 5 gm/30 lbs/week in divided doses. Courses should be limited to 10 days with a week rest period between.

Zirconium salts cause a marked increase in the excretion rate of plutonium and yttrium when given soon after the poisoning. The zirconium salts form colloidal aggregates in the blood stream which adsorb the plutonium. The subsequent disposition of the plutonium is related to the metabolism of zirconium, most of which is excreted in the urine.

Zirconium salts are expensive and unstable, having a shelf-life of 6 months to a year. They should be administered soon after poisoning to be effective. A 100 cc solution zirconium citrate, containing 2.1 gm of zirconium is administered intravenously. Calcium gluconate is administered with the zirconium to prevent tetany from developing as a result of a lower serum calcium level following citrate administration.

Zirconium may also be administered in the form of zirconium malate. Combined treatment of zirconium citrate and EDTA has been used with some success.

EMERGENCY TREATMENT CHART

Element	Symbol	Mass No.A	Effective Half-Life (Days)	Critical Organ	Max. Permis. Total Body Burden (μc)	Treatment
Americium	Am	241	890	Bone	0.06	CaEDTA
Antimony	Sb	All		Bone		BAL
Arsenic	As	76	1.09	Kidneys	11	BAL
Barium	Ba	140	12	Bone	1	Ca^{++}
Beryllium	Be	7	48	Bone, Lungs	725	ACTH, Cortisone
Calcium	Ca	45	151	Bone	14	EDTA
Cadmium	Cd	109	77	Liver	45	DTPA
						$Na_2CaEDTA$
Cerium	Ce	144	180	Bone	1	DTPA, BAETA, EDTA
Chlorine	Cl	36	19	Total Body	230	NaCl
Cobalt	Co	60	8.4	Liver	3	DTPA
Copper	Cu	64	0.53	Liver	120	DTPA, $Na_2CaEDTA$
Curium	Cm	242	120	Bone	0.06	DTPA
Hydrogen	H	3	19	Total Body	10^4	Water
Indium	In	190	7.3	Kidneys	23	
			10	Spleen	21	
		192	17	Kidneys	3	
			45	Spleen	3	
Iodine	I	131	8	Thyroid	0.6	I^-
Iron	Fe	55	61	Blood	10^3	Na_2Ca
		59	27	Blood	13	EDTA, DTPA
Lanthanum	La	140	1.6	Bone		DTPA, CDTA, EDTA
Lead	Pb	203	2.16	Bone	61	CaEDTA
		210+dr	6.76×10^2	Bone	0.2	
Manganese	Mn	56	0.104	Kidney	25	DTPA
			0.106	Liver	8	Na_2Ca, EDTA, BAL
Mercury	Hg					EDTA
Nickel	Ni	59	8	Liver	42	DTPA, BAL
Phosphorus	P	32	14	Bone, Blood	10	PO_4^{--}
Plutonium	Pu	239 sol.	4.3×10^4	Bone	0.04	DTPA
		239 in sol.	360	Lungs	0.02	EDTA
						Zirconium salts
Polonium	Po	210 sol.	40	Spleen	0.04	BAL
		210 met.	31	Lungs	0.02	
Potassium	K	42	0.51	Muscle	21	KCl
Radium	Ra	226	1.6×10^4	Bone	0.1	Decalcification
Sodium	Na	24	0.60	Total Body	15	NaCl
Strontium	Sr	89	52	Bone	2	Decalcification
		$90+Y^{90}$	2.7×10^3	Bone	1	
Tellurium	Te	127	13	Kidneys	4	BAL
		129	10	Kidneys	1.4	

EMERGENCY TREATMENT CHART (continued)

Element	Symbol	Mass No.A	Effective Half-Life (Days)	Critical Organ	Max. Permis. Total Body Burden (μc)	Treatment
Thallium	Tl	200	1.06	Muscle	40	BAL
		201	2.6	Muscle	310	
		202	6.9	Muscle	230	
		204	16.7	Muscle	200	
Thorium	Th	sol.	4.3×10^4	Bone	0.01	DTPA
		insol.		Bone	2×10^{-3}	EDTA
		^{234}Th+^{234}Pa	24.1	Bone	2	
Uranium	U	Nat.sol.	30	Kidneys	0.04	
		Nat.insol.	120	Lungs	0.01	DTPA
		233 sol.		Bone	0.04	EDTA
		233 insol.		Lungs	0.016	
Vanadium	V	48	12	Bone	10	Na_2Ca, EDTA
Yttrium	Y	91	51	Bone	3	DTPA, CDTA, EDTA
Zinc	Zn	65	21	Bone	400	$Na_2CaEDTA$, DTPA
Mixed Fission Products						DTPA

NOTE: There is much in the medical world to suggest that we are entering an era which will be remarkable for its astounding discoveries in the field of Radiation Medicine. This, naturally, will be a necessary development if medicine is to match strides with the anticipated worldwide expansion of nuclear power facilities for peaceful socio-economic progress. It has been convincingly demonstrated to the Pan-American Health Organization and the World Health Organization that this type of progress is a prerequisite in several countries of the Americas to a successful outcome of certain types of public health service campaigns

Hence, it appears proper to devote space in the Medical News Letter to announce that CDR John H. Schulte MC USN will serve as contributing editor for this new section. He reviewed and edited the above article by Doctor Robert A. Love.

Dr. Schulte is Director of the Special Weapons Defense Division, and Head of the Atomic Medicine Branch of the Research Division, BuMed.

—Editor

* Dr. Love is Medical Officer, Naval Reserve Research Company 3-9 Upton, N. Y., and Head, Industrial Medicine Division, Brookhaven National Laboratory. This work was performed as a special project for the Office of Naval Research.

MISCELLANY

PREPARATION OF REPORTS OF MEDICAL EXAMINATION (SF 88)
(Physical Standards)

From review of reports (SFs 88-89) received in BuMed, it appears that there is some misunderstanding as to which set of physical standards applies in certain cases. To clarify this matter, the following chart has been prepared:

Program	Reference
Appointment to commissioned grade in USN, USMC or Reserve components thereof	MANMED, Chapter 15
Enrollment in officer candidate training (all programs) leading to appointment to commissioned grade in USN, USMC or Reserve components thereof	MANMED, Chapter 15
Enlistment or reenlistment in USN or Reserve components thereof	Army Regulations 40-501, Chapter 2
Enlistment or reenlistment in USMC (chargeable)* or Reserve components thereof	Army Regulations 40-501 Chapter 2
Enlistment or reenlistment in USMC (non-chargeable)	MANMED, Chapter 15
Appointment or enlistment of female personnel in USN, USMC or Reserve components thereof	MANMED, Chpater 15

*Men, 17 years of age or older who have not previously served in any of the Armed Forces or who have served for a period less than 6 months since 16 September 1940.

A recent change to the Manual of the Medical Department (art 16-37(2)-added) provides that entries on Standard Forms 88 shall not be pretyped, preprinted, or otherwise entered or reproduced in advance of the physical examination. This change was prompted by the fact that many naval medical facilities had adopted the practice of preprinting certain entries on SFs 88 prior to actually conducting the examination. Such practice, which is no doubt used to facilitate reporting normal findings, leads to double entries (normal and abnormal) under certain items and often results in the includion of observations or judgments not actually made by the medical examiner, or failure to incorporate data noted during the course of the examination.

In addition, practically all items on the SF 88 have medical significance and information recorded by use of preprinting may be subject to attacks on grounds of questionable accuracy. This fact is of great importance in the adjudication of disability retirement benefits. Therefore, it is the desire of this Bureau that the practice of preprinting entries on SF's 88 be discontinued. Reports containing such entries received in the Bureau are currently being returned to the examining activity with the request that the individual concerned be reexamined and that original typewritten reports be submitted. Dissemination of the foregoing information to all Medical Department personnel concerned with conducting and reporting physical examinations is requested.

—Physical Qualifications and Medical Records Division, BuMed

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NBS Publication on Radiation Quantities and Units

Radiation Quantities and Units: International Commission on Radiological Units and Measurements (ICRU) Report 10a, 1962, National Bureau of Standards Handbook 84 was issued on November 14, 1962.

Handbook 84 (8 pages) is one of a new series of publications presenting recommendations of the International Commission on Radiological Units and Measurements. It deals with one aspect of the field with which the Commission is concerned—radiation quantities and units—and presents recommendations of the Commission at its meeting in Montreux, Switzerland in April 1962.

The Commission reexamined the concepts to be employed in radiation dosimetry, tightened the "standards of rigor" in these concepts, and dealt with the resulting formality of terms and definitions. Recommendations cover such quantities and units, and deal with terms like "exposure," "absorbed dose," "kerma," "activity," "rad," "currie," and "roentgen."

The 37-year old ICRU has had as its principal objective the development of internationally acceptable recommendations regarding: (1) quantities and units of radiation and radioactivity; (2) procedures suitable for the measurement and application of these quantities in clinical radiology and radiobiology; and (3) physical data needed in the application of these procedures, the use of which tends to assure uniformity in reporting. Its task also extends to the development of recommendations on radiation quantities, units, and measurements in the field of radiation protection. In evaluating radiological equipment, efforts were confined to standardization in methods of measurement.

From the Note Book

Admiral Galloway Receives High Honor from Military Surgeons. At the 69th Annual Meeting of the Association of Military Surgeons of the United States in Washington, D. C., on 14 November 1962, Rear Admiral Calvin B. Galloway MC USN was elected President of the Association. This organization was formed in 1893 by authority of Congress to promote the interests of military medicine. Membership is open to medical department officers of the U. S. Army, U. S. Navy, U. S. Air Force, Veterans Administration, U. S. Public Health Service, National Guard of the United States, and the military medical services of other countries.

Admiral Galloway is Assistant Chief of the Bureau of Medicine and Surgery for Research and Military Medical Specialties.

Awards by Association of Military Surgeons at 1962 Annual Meeting:

Captain Roger H. Fuller MC USN, Deputy Director of the Armed Forces Institute of Pathology, received the Sir Henry Wellcome Medal and prize for the best essay on a subject related to military medicine. His subject was "Drowning and the Postimmersion Syndrome."

Captain Robert A. Phillips MC USN, Commanding Officer of Naval Medical Research Unit No. 2 located at Taipei, Taiwan, received the STITT Award for cholera research.

Commander John E. Rasmussen MSC USN, Acting Head of the Behavioral Sciences Department, Naval Medical Research Institute, NNMC, Bethesda, Md., was presented the newly established John Shaw Billings Award for "outstanding potential as an administrator in the field of medicine." He was cited for his contributions in revising psychiatric fitness standards applicable to naval personnel. Also, he was instrumental in the development of a special program for assessment of personnel assigned to Operation Deep Freeze in the Antarctic, and the establishment of a research program in preventive psychiatric measures for personnel who might man future weapons systems.

NMRI Staff Member Assumes Presidency of Important Professional Society. Doctor Clay G. Huff, Director of the Naval Medical Research Institute's Department of Parasitology, assumed the Presidency of the American Society of Tropical Medicine and Hygiene at the annual convention in Atlanta, Georgia. Doctor Huff had previously held other high positions in this Society which is the oldest organization of its kind in the world.

Second Symposium on Surgery of the Hand at USNH Philadelphia. The U. S. Naval Hospital, Philadelphia served as host for the Second Symposium on Surgery of the Hand on 8 December 1962. The symposium was held in the Naval Hospital

Auditorium from 0845 to 1700. The following program was scheduled:

Various Pathologic Conditions Affecting the Bones and/or Soft Tissues of the Hand - Henry L. Jaffe
Functional Anatomy of the Hand - Robert A. Chase
Reconstruction of Congenital Anomalies of the Hand - Martin A. Entin
Common Acute Problems in the Hand - Richard S. Oakey Jr.
The Divorce Phenomenon as it Relates to Injuries in the Hand - Warner D. Bundens Jr.
The Late Management of Ischemic Muscle Contractions in the Hand and Forearm - J. William Littler
The Management of Acute Fractures of the Hand - Paul R. Lipscomb

One of the highlights of the occasion was an unrehearsed panel discussion and quiz on hand problems as presented by slides and history. The panel members were Doctors Entin, Oakey, Littler, Lipscomb, and Bundens. Doctor William C. Trier acted as moderator.

The contributing organizations which made up the symposium were the U. S. Navy, the Robert H. Ivy Society, the Philadelphia Orthopedic Society, and the Regional Committee on Trauma of the American College of Surgeons.

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Items from WHO CHRONICLE - November 1962

Human leukaemia presents many epidemiological puzzles. Mortality is relatively high in the white population of the USA, but not in the non-white; in Denmark, and in the Jewish population of Israel, but not in Finland, France, Ireland, Italy, or Japan. In the USA, the mortality is about 50% higher in towns than in the country, and the disease is more common in first-born children of older mothers and in Mongols. In England and Wales, mortality is higher in the urban areas than in rural areas of the north, but the reverse is true of the south.

Trials of a combined poliomyelitis and DTTAB (diphtheria, tetanus, TAB) vaccine have given only partially satisfactory results, apparently because of interference between the vaccines. The precise nature of the interference remains obscure, but it is thought that nonspecific immune factors may be involved.

It is clear that there is a close relationship between air pollution and disease, but its exact nature is unknown, and it is not yet possible to determine exactly which pollutants are responsible for causing or exacerbating specific illnesses. For epidemiologic studies in this field to be successful, greater agreement is needed on measurable indices of air pollution and of the diseases with which they are associated.

DENTAL SECTION

Vitamins: Charms or Nutrients

Charles S. Davidson, MD, Boston, Mass. JAMA 176(10):868-869, 10 June 1961.

This morning while walking to my medical student lecture on vitamins, I passed a store window full of vitamin preparations. These included "natural vitamin B complex tablets," "super-natural high potency natural vitamins," vitamin A with 50,000 U. S. P. units per capsule, vitamin E capsules with 100 international units, and "natural" vitamin A and D capsules, among others. What should I advise students about preparations like these, some of which might produce toxicity if long continued, about vitamin preparations also containing various unnecessary minerals, about prophylactic and supplemental multivitamin mixtures? I decided that they should be offered the known facts, be given my reasoned (I hope) opinion, and left to think for themselves.

The facts are that many vitamins are known to be required by man, that some in large doses may be toxic, that most have intracellular metabolic activities as coenzymes and that normal individuals eating a variety of nutritious foods need no prophylactic or therapeutic vitamins or minerals. I referred the students to several texts on the subject. It is dangerous and rather easy, I said, to prescribe vitamins for symptoms due, in fact, to the subtle beginnings of serious illness. Vitamin administration is no substitute for care in diagnosis nor should they be used in lieu of careful search for other causes of the symptoms and signs. If after careful study of a patient, however, it is found that deficiency states may be present or are likely to arise, judicious prescription of vitamin mixtures is mandatory (for preparations see JAMA 169:41-45, Jan. 3, 1959).

The use of vitamins as placebos or to fortify suggestion in treating a neurasthenic patient, I continued, is probably frequent in spite of the cost. There is the advantage of strong therapeutic support from "Madison Avenue" with its often exaggerated claims. Thus ran my lecture and continued with mention of H. L. Gossage's article in the March, 1961, Harper's magazine (p. 64), "The Golden Twig." Here the use of magic in advertising is discussed, taking the "twig" from Sir James Frazer's classic "The Golden Bough." Vitamins to the consumer have come to be what Gossage calls "charms." He might well have been speaking of vitamins when he wrote: "Advertising has imbued them with prowess quite beyond any reasonable assessment of their plain-Jane natures." The physician who uses vitamins as placebos should, perhaps, pay

thanks to vitamin promotors for making these "charms" so "real" and therefore effective. He must, however, not delude himself into believing that jangled nerves, malaise, depression, anemia, and other often hard to explain symptoms are necessarily due to vitamin deficiencies. He not only must study his patient carefully, but also must learn to know the true nature and effectiveness of vitamins, an unfolding subject requiring careful and continued study. He is then in a position to advise and treat his patients effectively. If he should choose to take advantage of the health superstitions of these charms and use vitamins for their placebo effect, he has made a positive decision and is not deluding himself.

The physician would lose much therapeutic effectiveness without the "beliefs" of his patient, but he must clearly distinguish between "charms" and the truths of scientific medicine.

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Successful Indirect Pulp Capping in Acute Pulpitis

Lorinczy-Landgraf, Ervin. Szentkiralyi ut 40, Dental Clinic of the University of Budapest, Hungary. Sikeres indirekt sapkazas heveny fogbellob esetekben. Oesterr. Zschr. Stomat. 58:20-23, Sept. 1961. Dental Abstracts 7(10):591, Oct. 1962.

Calcium hydroxide has been used for the last 7 years for the indirect pulp capping of 1,000 teeth with acute pulpitis, at the Dental Clinic of the University of Budapest, Hungary. The teeth treated had vital pulps and large carious lesions. Removal of all caries would have resulted in pulp exposure. Patients were followed up for several years. One hundred and twenty teeth which were free of symptoms were extracted from 10 days to 3 years after indirect pulp capping, and the pulps were examined histologically.

Pulps of teeth extracted 10 dyas after indirect capping showed partial pulpitis. There was abscess formation even when inflammation was limited to one pulpal horn. This demonstrates that the suppurative process in pulpitis occurs much sooner than generally stated.

Pulps of teeth extracted several months after indirect capping showed that underneath the point of exposure a considerable amount of secondary dentin had formed in a dome-shaped layer above the carious lesion. The zone of inflammatory cells in the pulp tissues surrounding the abscesses become narrower and less dense. This process of recovery first appeared in abscesses situated in the deep tissues of the pulp. The pulp capping had reversed the inflammatory process. There were significant amorphous calcium deposits. Apparently, the healing process had exhausted the pulp and led to pulpal atrophy.

Most of the pulps of teeth extracted one year or more after indirect capping showed recovery, but in some the reparative process had not ended. Clinically, these teeth before extraction had a diminished sensitivity to applied cold. Decalcification of the crown of the pulp could be seen in roentgenograms,

even in young teeth. Histologically, there were no signs of inflammation. A large amount of secondary dentin had formed adjacent to the former carious lesion, and the underlying pulp was intact. The previous pulpal inflammation had let to complete decalcification and disappearance of the primary dentin. The odontoblastic layer had been destroyed.

Recovery of the pulp is possible even when large abscesses have developed. With the use of calcium hydroxide alone in the indirect capping of the pulps of 1,000 teeth with acute pulpitis, healing occurred in 80% of the molars treated. The rate of healing was lower in bicuspids and anterior teeth, perhaps because collateral circulation is missing in multirooted teeth.

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The Need for Skepticism

Science 138(3537):75, 12 October 1962.

The synthesis of xenon tetrafluoride and related compounds described in the current issue (p. 136) makes necessary the revision of many chemistry textbooks. For about 50 years, students taking elementary courses in the subject have been taught that the noble gases are nonreactive. Millions of pupils have absorbed this dogma and faithfully parroted it back at examination time.

The first evidence that xenon might participate in chemical combination was obtained by Neil Bartlett, who suggested that compounds of the type $XePtF_6$ could be made. This discovery has been followed up by a team of scientists at Argonne National Laboratory. The work they present is clear-cut and convincing. Xenon reacts with fluorine to form more than one relatively stable compound. A variety of different procedures independently confirm the chemical constitution of the new product. Indeed, the ease with which XeF_4 is made and its properties are explored is almost shocking. One can introduce the 2 gases into a simple system, heat the mixture for 1 hour at 400° C, and observe the formation of crystals. The experiment can be performed readily by any chemist and by many other scientists, even though they may have had only elementary training in chemistry. Some caution must be employed, for fluorine is poisonous and reactive, and the xenon fluorides may be dangerous. However, xenon and fluorine are available commercially in safe containers. Thus the essential ingredient in discovering XeF_4 was not money or equipment, but an idea. Even the choice of fluorine as a reactant seems obvious since it is the most reactive of all the elements.

There is a sobering lesson here, as well as an exciting prospect. For perhaps 15 years, at least a million scientists all over the world have been blind to a potential opportunity to make this important discovery. All that was required to overthrow a respectable and entrenched dogma was a few hours of effort and a germ of skepticism. Our intuition tells us that this is just one of countless opportunities in all areas of inquiry. The imaginative and original mind need not be overawed by the imposing body of present knowledge or by

the complex and costly paraphernalia which today surround much of scientific activity. The great shortage in science now is not opportunity, manpower, money, or laboratory space. What is really needed is more of that healthy skepticism which generates the key idea—the liberating concept. —P. H. A.

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Personnel and Professional Notes

Dental Training Committee to Meet. The Dental Training Committee will meet in the Bureau of Medicine and Surgery early in the calendar year of 1963 to consider applications from qualified dental officers for continuing educational opportunities. It is anticipated that assignments may be made, but not necessarily limited to, the following areas: (1) General Postgraduate Course; (2) Residency in Oral Surgery; (3) Residency in Periodontics; (4) Residency in Prosthodontics; (5) Residency in Oral Medicine; (6) Residency in Oral Pathology; (7) Specialized courses in the dental specialties; (8) Graduate and long postgraduate courses at universities (Public Health, Basic Sciences, Dental Specialties, etc.)

Interested dental officers should submit their applications in accordance with Article 6-130, Manual of the Medical Department to arrive in the Bureau not later than 1 February 1963.

Dental Treatment for Veterans. Public Law 87-583 establishes dental treatment benefits, on a one-time-completion basis, for peace-time veterans. Personnel discharged on or after 14 August 1962 are eligible if so determined by the veterans administration. The Bureau of Medicine and Surgery policy in regard to discussing eligibility for dental treatment with such persons is set forth in BUMED INSTRUCTION 6620.2.

Dental Service Report, DD Form 477-1. All responsible dental officers at each separate command are reminded that the Dental Service Report, DD Form 477-1 (Equipment and Facilities Supplement) shall be submitted on 1 January of each year. The original shall be addressed to BUMED, one copy to the Field Branch, BUMED, 29th Street and 3rd Avenue, Brooklyn 32, N. Y., and one copy to the reviewing officer. In accordance with Advance Change 13-1, Manual of the Medical Department, line 9 of this report should indicate air turbines as separate equipment items regardless of whether they are attached to and accounted for as part of the operating unit.

Dental Service Report. BUMED NOTICE 6600 dated 18 May 1962 transmitted a 10-digit Electronic Accounting Machine (EAM) processing code for activity identification and to modify certain reporting procedures. The abbreviated Dental Service Report, DD-477, demonstrates how these changes are to be recorded. Under Part IV - Remarks, the items in the illustration are to be recorded in the format shown. Staff dental officers may require additional

information in this section, but any additional information shall not alter the Bureau requirement. "Dental Officer workdays" are based on 8 work hours a day. The number of workdays in a quarter may vary between activities, but every workday shall be recorded.

254 3 10 04 24 **DENTAL SERVICE REPORT**

REPORT CONTROL SYMBOL MED 6600-2

☐ ARMY ☒ NAVY ☐ AIR FORCE

REPORTING FACILITY AND LOCATION
U. S. NAVAL HOSPITAL
BLANK, MARYLAND

PERIOD COVERED
JUL
AUG 1962
SEP

PART I - DENTAL PROCEDURES

45. EXTRA-ORAL ROENTGENOGRAM		13		4	3	20	
F. OTHER							
46. EXAMINATIONS (*Types 1,2, and 3*)		122		11	13	146	
47. ORTHODONTIC TREATMENT							
48. POST OPERATIVE TREATMENT		67		5	2	74	
49. MISCELLANEOUS		4				4	
50.							
51. *TOTAL PROCEDURES LINES 1 - 50*	35	1964		29	71	2099	738
52. TOTAL [illegible] SITTINGS	9	554		16	27	606	

2. NAVY-MARINE	1500								
3. AIR FORCE									
4. TOTAL	1500								
5. GRAND TOTAL	1500								

PART IV - REMARKS

COPY FOR REVIEW SENT TO: STAFF DENTAL OFFICER
COM PRNC
U. S. NAVAL STATION (NAVY YARD ANNEX)
WASHINGTON 25, D.C.

TOTAL DENTAL OFFICER WORKDAYS DURING REPORTING PERIOD----------126
DENTAL OFFICER WORKDAYS LOST DUE TO COLLATERAL DUTY---------- 10
DENTAL OFFICER WORKDAYS LOST DUE TO ALL OTHER CAUSES---------- 16
TOTAL DENTAL OFFICER DAYS WORKED----------100

(ONLY "REMOTE" AND FOREIGN SHORE STATIONS UTILIZE THE FOLLOWING)
TOTAL NUMBER OF DEPENDENTS AUTHORIZED TO RECEIVE OUTPATIENT DENTAL CARE---6554

U. S. Navy Dental Corps Continuing Training Program. The U. S. Naval Dental Corps is offering a series of short postgraduate courses conducted by members of the staff of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md.

Among the courses to be offered is Periodontics. The date of the course is 25 February to 1 March 1963. This course consists of lectures, discussions, and clinical demonstrations. Emphasis is placed on tissue changes in occlusal trauma, a practical approach to eliminate the periodontal pocket, and the systemic aspects of periodontal disease. Surgical procedures are reviewed.

The instructor will be Captain J. R. Conant, DC, USN. Quotas have been assigned to ComOne, ComThree, ComFour, ComFive, ComSix, ComNine, ComSRNC, and CNATRA.

This short course is open to active duty career dental officers of the Armed Forces in accordance with quotas established by the Bureau of Medicine and Surgery.

Applications should be received in the Bureau as early as possible and preferably, not less than 4 weeks prior to commencement of the course. The Bureau Professional Advisory Board will make recommendations on all requests, and upon approval by the Surgeon General, applicants will be notified as to the final action. Those approved will be nominated for TAD or authorization orders, as appropriate. Accounting data will be forwarded to individual officers nominated for TAD orders. Staff Dental Officers not utilizing assigned quotas shall report this information to BUMED, Code 6111, one month prior to the convening date of the course. This will allow the Bureau to fill the quota from other districts.

Armed Forces Dental Society of Okinawa and Okinawan Dental Society Meet. Captain John V. Reilly, DC, USN was the principal speaker at a joint meeting of the Armed Forces Dental Society of Okinawa and the Okinawan Dental Association held the 28th of November at the Fort Buckner Officers' Mess. His subject was a resume of pathologic conditions revealed by oral roentgenography. Captain Reilly is presently attached to the 3rd Dental Company, 3rd Marine Division (Rein), FMF. Colonel E. D. Chase, DC USA is president of the Society.

Fourteen Dental Officers Attend Casualty Care Course in Norfolk. Fourteen dental officers, including 2 from Brazil, 2 from the U. S. Air Force and 1 civilian, selected by the American Dental Association, have completed the Casualty Treatment Training Course at the U. S. Naval Dental Clinic, Norfolk, Va. This course is one of 4 such courses conducted throughout the Navy to further develop in Dental Officers the skills needed in emergency casualty treatment to enable them to supplement the medical effort in time of major emergency.

This was the fourth course to be conducted at the Norfolk Command this year. The next class convenes on 4 February 1963. Similar courses also are held at Bethesda, Md.; Great Lakes, Ill., and San Diego, Calif.

The Casualty Treatment Course at Norfolk is under the direction of Captain J. L. Keener, DC, USN, Head of Oral Surgery and assisted by Lieutenant Commander H. C. Pebley, DC, USN. Rear Admiral E. G. F. Pollard, DC, USN is Commanding Officer of the U. S. Naval Dental Clinic.

Naval Dental Officers Appear at Puerto Rico Meeting. A table clinic was presented by Captain J. A. Thimes, DC, USN and Commander V. H. Silberstein, DC, USN at the Annual Puerto Rico Dental Association Convention, held November 3-6. The title of the clinic was "Free End Saddle Relationship in Partial Denture Design."

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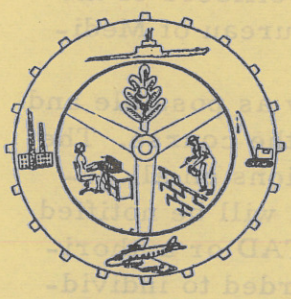

OCCUPATIONAL MEDICINE

Lighting Research

Sylvester K. Guth, Radiant Energy Effects Laboratory, Lamp Division, General Electric Company, Nela Park, Cleveland, Ohio; Industrial Hygiene Journal 23(5): 359-371, September-October, 1962.

The increasing complexity of industrial operations has placed a corresponding responsibility on the shoulders of those who are in a position to control the various environmental factors which influence human performance and efficiency. Even in this era of automation we find that the successful operation of plants and equipment—often involving capital expenditures as high as $25,000 for each employee—depends largely upon how well the worker can function as an individual or as a member of a team. That the human element is recognized is illustrated by the considerable emphasis being placed upon properly conditioning the work-world environments for those who must occupy them for extended periods of time.

Important among the environmental factors are light and lighting, which enable workers to see quickly, accurately, safely and comfortably. Even with increasing mechanization there are few industrial tasks that are not dependent upon the ability of a worker to see. Countless researches involving many criteria have been conducted to obtain fundamental data upon which the specification of light and lighting can be based. Such investigations emphasize that light and vision are tools used by the human being for the performance of seeing. These tools may be considered as a partnership in which one is essential to the usefulness of the other.

Light and lighting must fulfill at least three basic objectives:

(1) Provide sufficient light on the task so that a worker can see what he needs to see in order to perform the task in accordance with certain standards of speed and accuracy.

(2) Provide a level of illumination which will permit a worker to perform the task with minimum effort and maximum safety.

(3) Provide brightness relationships within the entire visual environment which will not detract from a worker's ability to see or will not produce discomfort.

It is evident that the first 2 objectives deal specifically with the visual task. The third concerns primarily those areas outside the task. However, all the

objectives are interrelated and must be properly coordinated in order to provide the best seeing conditions.

The primary approaches to the determination of the effectiveness of light and lighting have been in terms of visibility, visual performance and ease of seeing. More recently equal emphasis has been given to the brightnesses of room and work surfaces and of lighting equipments. Often neglected aspects of the problem are differences in visual ability and glare sensitivity. Since seeing is a complex process and a dynamic activity of human beings, it is obvious that its many facets must be studied and evaluated in order to develop sound and logical lighting recommendation.

Visibility and Visual Performance

Seeing is a complex activity of human beings. It involves the many variables inherent in the observer, the visual task and the visual environment. The terms physiological, psychological and pathological are merely indicative of many individual factors which influence how well an individual can see. The status of his eyesight, binocular visual ability and age for example, affect visibility appreciably. Furthermore, differences among individuals cannot be ignored.

The parameters of visibility—size, contrast, brightness and time—generally are used to describe and define the visual task. These are considered the fundamental factors of visibility. However, a number of modifying factors, some of which relate to the observer-environment complex, often exert a considerable influence upon visibility and must not be neglected when studying the over-all problem. These may affect retinal adaptation—a physiological characteristic of the observer—or they may alter the contrast relationship of the details of the visual task. All of these factors, the basic parameters and modifiers, are involved in everyday seeing to varying degrees, depending upon the visual task. For example, some industrial operations require split-second seeing; in others the demands for high precision and accuracy make time a factor of little or no consequence.

The recognition requirements pertain to the functional demands of the job. The simplest, of course, is the mere detection of the presence of an object. However, most visual tasks involve the discrimination of details. In either case, movement and location of the task are important to how well it can be seen. When the seeing of details is required, the physical complexity of the object, the number of details involved and the interpretation required all have considerable influence upon visibility and the success with which the task is performed.

It is readily demonstrable that the unaided human being cannot make accurate measurements. All he can do is judge qualitatively that things are hot or cold, soft or hard, etc. Therefore, as in the case of laboratory measurements of visibility, it has been necessary to develop instruments and techniques for evaluating the wide variety of work-world tasks on some rational basis.

A number of instruments have been developed for evaluating visibility. While the physical arrangement of such instruments are different, the general methods employed are essentially the same. The visual task or object is reduced to the threshold of visibility, or the point where they can be just barely seen, by decreasing one of the fundamental factors. This can be accomplished by reducing the contrast of the details with their background, or the apparent brightness of the task, or a combination of the two, by means of a variable density filter. It is assumed that the relative visibilities of different objects are proportional to the extent of the decrease in contrast or brightness required to produce the threshold conditions. By relating such threshold measurements to extensive laboratory data on standardized test objects, it is readily possible to determine the lighting requirements for any desired visibility level. This is the procedure used in the application of the Luckiesh-Moss Visibility Meter and also, more recently, by Blackwell with his Visual Task Evaluator.

TABLE I

Values of Relative Visibility and Foot-Candles Required for Various Visual Tasks to be Equal in Visibility

Task	Relative Visibility	Foot-Candles For Equal Visibility (VL=5.6)
Typing on white paper	8.8	10
Magazine text	5.6	20
Handwriting in pencil	4.0	40
Newspaper text matter	4.0	40
Shorthand notes	3.4	60
Bookkeeping	3.0	80
Drafting	3.0	80
Telephone directory	2.6	120
Medium grade assembly and inspection	2.5	140
Metal buffing	2.4	160
White thread on white cloth	2.3	200
Metal finishing, surface grinding	2.0	340
Black thread on black cloth	1.55	860
Precision die making	1.40	1400

In the second column of Table I are shown the relative visibilities, as obtained with the Luckiesh-Moss Visibility Meter, of a variety of representative tasks when all are illuminated to the same lighting level. It should be pointed out that these values of relative visibility are for certain specific details of the respective tasks; other details may be lower or higher in relative visibility. This particular scale of visibility ranges from 1 to 20, on which the former represents the approximate threshold of visibility and the latter corresponds to the visibility of a specific large black object on a white background with

standardized viewing conditions. The scale has a rational basis, but by itself is merely an indicator of the relative visual difficulty of various tasks. It should not be inferred, for example, that the newspaper text is approximately twice as visible as the metal finishing task. Nevertheless, the values do emphasize that some tasks are very low in visibility. Furthermore, they can be converted into other more meaningful comparisons.

One such conversion is into the foot-candles required for equal visibility as shown in the third column of Table I. In this example, the visibility level for purposes of comparison is 5.65, which corresponds to that of the magazine text when illuminated with 20 foot-candles. These values illustrate dramatically that those tasks having inherently low visibility due to low contrast and small size of details require much higher foot-candle levels than those which are relatively easy to see. Furthermore, a relatively small reduction in visibility, when the task is difficult, requires a large compensatory increase in illumination. The relationship between relative visibility and foot-candles for equal visibility is not linear. Similar tables of foot-candles for equal visual performance have been developed by Blackwell. The actual values depend on the "standard" of visibility or of visual performance selected as a reference.

The foot-candles indicated in Table I should be considered significant as relative, rather than as recommended levels of illumination. They do emphasize the importance of visibility as one of the basic approaches toward developing lighting recommendations. However, evaluations of other aspects of seeing must be combined with the data on visibility and visual performance in order to have a broad basis for the best lighting practice.

Ease of Seeing

Even though the illumination on a task may be such that it provides a reasonable visibility level or even a relatively high rate of working, we know from experience that more light makes the job easier. Visibility provides a measure of ability to see, but not ability to do.

Many attempts have been made to detect and to appraise ocular fatigue by measurements of one of the visual functions such as visibility or visual acuity. In spite of the fact that a critical near vision task was performed for extended periods, up to 8 hours, the decrement in such functions generally has been small and insignificant, even though the workers expressed definite indications of fatigue and discomfort. Obviously, such criteria are of no practical use in relating ocular fatigue or discomfort to the visual conditions under which the critical seeing was performed. Therefore, it has been necessary to explore the possibilities of other more sensitive criteria which will more adequately appraise the more deep-seated effects of poor seeing conditions.

The Environment

The third basic objective which light and lighting must fulfill is to provide brightness relationships within the entire visual environment which produce

the most satisfactory seeing conditions in terms of visual performance, ease of seeing, safety and comfort. As has been shown, the brightness of the task determines directly its visibility and the ease with which it is performed. On the other hand, the brightnesses of the region surrounding the task and more remote areas have a less obvious effect upon visibility and visual performance. However, they do determine directly the comfort of the visual environment. That is to say, the quality of lighting may be such as to have little or no significant effect upon visibility or visual performance but may result in extremely uncomfortable or distracting seeing conditions.

In many practical seeing situations a worker may look from a brighter area toward a darker one. The three 5-minute experimental conditions included reading: (a) with the book illuminated to 20 foot-candles, (b) during repeated alternating periods of 15 seconds each with 2 to 20 foot-candles, and (c) with an illumination of 2 foot-candles on the book. Condition (b) was a "forced" type of test which approximated looking back and forth between two areas of greatly different brightnesses. As was to be expected, the results indicate that continual readaptation is less desirable than a very low lighting level. Since the reading periods were short, these results are considered conservative; higher relative rates of blinking for the less desirable conditions would be expected with longer reading periods.

While the rate of working usually has been found to be a relatively insensitive criterion, one investigation (which involved rapidly seeing details alternately on light and dark surfaces) produced striking results. Using 100 foot-candles as a base, a 5 to 1 brightness ratio between central and surrounding areas produced the same decrement in rate of working as about a 30:1 reduction in illumination. Results such as these emphasize the need for providing proper brightness relationships between a task and its immediate surroundings, or with regions which may be viewed during work periods.

The Human Factor

As has been pointed out, the human being cannot be disassociated from studies of the effects of light and lighting. Through his eyes he is an integral part of the partnership of light and sight. Therefore, it is necessary to bear in mind the effects of age, status of eyesight and many other factors which influence individual visual responses.

Most research data are presented in terms of averages which serve the useful purpose of providing information about the relationships among the variables being investigated. Such data usually are obtained with a relatively few young adult observers possessing excellent eyesight. It would seem to be of at least equal importance to study the effects of illumination and brightness relationships upon the responses of large groups of observers representing other age groups and those having less than so-called normal visual abilities. Such data would tend to minimize the practice of submerging in averages the individual differences among observers. Recent studies of visibility and visual comfort have shown that persons vary considerably among a group, but that individually each is remarkably constant.

An Expanded Concept

This brief glimpse of a small part of the available information should make it evident that we can develop an expanded concept regarding the effectiveness of light and lighting which should be useful for guiding our thinking toward the determination of ideal seeing conditions. This should be the primary objective of the application of research data; practicability and economic factors should play no part in the development of such an expanded concept. Our knowledge still is far from complete, but a number of valuable guide posts are being established.

TABLE II

Levels of Illumination Currently Recommended for Typical Work-World Visual Tasks

Task	Foot-Candles On Task*
Industrial Tasks	
Rough, easy assembly work	30
Rough bench and machine work, ordinary inspection	50
Medium bench and machine work, rough grinding, medium buffing and polishing, difficult inspection	100
Color inspection, grading and evaluation, making and finishing shoes, highly difficult inspection	200
Fine bench and machine work, medium grinding, fine buffing and polishing, sewing, very difficult inspection	500
Extra-fine bench and machine work, fine grinding, welding extra-fine assembly work, most difficult inspection	1000
Office Tasks	
Corridors, elevators, escalators, stairways	20
Reading high contrast or well printed material, tasks and areas not involving critical or prolonged seeing such as conferences, interviews, inactive files and washrooms	30
Regular office work, reading good reproductions, reading or transcribing hand writing in hard pencil or on poor paper, active filing, index references, mail sorting	100
Reading or transcribing hand writing in ink or medium pencil on good quality paper, intermittent filing	70
Accounting, auditing, tabulating, bookkeeping, business machine operation, reading poor reproductions, proof reading, rough layout drafting	150
Cartography, designing, detailed drafting	200

* Minimum on task at any time

Lighting Recommendations

This brief discussion of researches in seeing would be incomplete without some indication of how these results are applied. Lighting research should pave the way for lighting practice. A formidable amount of information on the interrelations among light, vision, and seeing has become available. Furthermore, new and continuing developments of light sources and lighting techniques provide the means for applying these data to the countless seeing problems encountered in today's industrial complex.

The lighting requirements for ideal seeing conditions should be derived from consideration of such factors as optimal visibility and visual performance and maximal ease of seeing. Ideal levels of illumination and brightness relationships should be looked upon as ultimate objectives. Their establishment should not be hampered by their practicability or attainability. When developing lighting recommendations it is necessary to include such variables as economics and ability to provide desirable lighting levels with the facilities and equipment now available. Thus, recommendations become flexible rather than rigid. They should improve with advancement in illuminating engineering. This has happened in the past and will likely continue in the future.

Perhaps one of the greatest advances in recent years has been the recognition that lighting is a production tool. Increasing evidence of user benefits is supplementing and confirming laboratory data. For example, records of improvements in better safety records, reduction in costs, etc., furnish information not available in the laboratory. These facets of the whole picture should be considered when developing lighting recommendations.

Based upon such broad considerations, the Illuminating Engineering Society has developed recommendations for the wide variety of tasks encountered in industry and other work areas. A few representative values are presented in Table II. In general, these foot-candle levels follow the progression of the relative foot-candles for equal visibility shown in table I. However, an allowance has been made for such considerations as differences among individuals, age, and ease of seeing. These foot-candles recommendations have been found to be economically justified and attainable.

These lighting levels are not intended to be the "last word," but, as has been done in the past, will be increased as more efficient light sources and improved lighting techniques are developed. An additional stimulant will be the greater realization of the benefits received by everyone—worker and management—from the higher lighting levels. Each such change will bring us closer to the ideal.

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More than $50 million in tax money is used every year for the removal of litter along major highways. The U. S. Forest Service budgets $2-1/2 million each year for sanitation and litter removal from the national forests. Litterbugs cost Los Angeles County taxpayers more than $7 million annually. Washington, D. C., spends nearly $3 million for cleanup.

(US DHEW PHS Public Health Reports 77(10):909, October 1962)

Questions

From "Questions," J Occup Med, 55 E. Washington Street, Chicago 2, Ill., Vol. 4(8), August 1962.

Question: A man has an occupationally caused rupture of a lumbar disc, which is removed without complications. Does this man as a laborer have any increased probability of similar trouble as compared to a like man without back complaints; and should he be restricted in any laboring activity? What are the important considerations in evaluation of his abilities as a laborer, such as physique, build, age, etc., and what are the primary factors in their appraisal?

Answer: In a man having a ruptured lumbar disc, the probability of similar trouble is greater than in a like man without back complaints. The injured man must be considered as having a permanent partial disability with regard to the bending, lifting, carrying, and pushing type of activity required in laboring.

In most instances, over a 2-year period, a substantial degree of fibrous ankylosis apparently takes place at the site of the removed nucleus pulposus. This is not entirely solid, and the mechanics disturbed by removal of the disc are likely to cause symptoms with gross stresses. Also the possibility of damage having occurred at a higher or lower level in the first episode cannot be overlooked. The resilient capacity of the nucleus is important to the vertebral bodies and the facets, the normal patency of the intervertebral foramina, and the proper functional relations of the articular facets.

Disc syndromes appear in persons with all types of physical build. It is generally felt that the stocky, well-muscled individual below 40 stands the best chance of compensating for the injury, through the overdevelopment of muscular support. A patient with a history of low-back trouble or one with residual nerve-root irritation is especially prone to future difficulty. General as well as local flexibility is an important consideration in evaluating laboring ability; it appears to indicate the degree of ability to compensate for damage at one level. Stiffness also is frequently an early sign of so-called wear-and-tear changes occurring in joints.

In general, laboring activity should be restricted for anyone having disc damage, even though strengthening exercises have been instituted and an external support added.

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Methyl Chloroform

Seymour Levinson, Industrial Hygienist at Norfolk Naval Shipyard, Norfolk, Va., for the Quarterly Industrial Health Report, No. 34, July - September, 1962.

The use of a proprietary product containing methyl chloroform (1, 1, 1, trichloroethane) resulted in a fatality on board a submarine in the Shipyard for

repair. This product had been previously reviewed by the Hazardous Chemical Control Committee and classified as toxic. The necessary BUSANDA Label was accordingly assigned. The presence in the solvent of methyl chloroform was the basis for this classification. The company-labeled container reports the product as 1/20 as toxic as carbon tetrachloride. This is in conformity with the relative ratio of their threshold limit values as established by the American Conference of Governmental Industrial Hygienists. But this comparison applies only to safe 8 hour daily exposures. Any volatile solvent, regardless of its chronic toxicity, used in a confined space will, without adequate ventilation, inevitably reach concentrations high enough to "anesthetize" or asphyxiate.

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Atmospheric Monitoring of Toxic Levels of Missile Propellants

"Industrial Hygiene News Report," published by Flournoy & Associates, 1791 Howard St., Chicago 26, Ill., Vol. V, No. 10, October 1962.

Based on experience accumulated in various toxic vapor detection efforts at the Rocket Research Laboratories (Edwards, Calif.), requirements considered reasonable for a tentative atmospheric monitoring arrangement have been evolved. The following points were listed by John Nakamura of Rocket Research Laboratories and Kenneth E. Ball of Mine Safety Appliances Company (Pittsburgh, Pa.) at the annual meeting of the American Conference of Governmental Industrial Hygienists in Washington, D.C., last May.

1. Accuracy: plus or minus 25%. This specification is considered realistic based on the fact that a prepared 1 ppm concentration is not likely to be much more accurate than 0.8 to 1.2 ppm, and furthermore, orders of magnitude concentration differences occur inches apart due to natural turbulence. However, repeatability (defined as the ability of an instrument to attain similar read-outs for the same mix) should be much better; perhaps within 2%.

2. Range: capable of at least 2 orders of magnitude, preferably more. Logarithmic outputs are attractive in that sufficient resolution in the low or MAC areas is available along with a wide detection range.

3. Speed of Response: 90% of final reading or more in less than 10 seconds. Rapid response and recovery are extremely important since concentration buildups can be quite rapid and a few seconds may be appreciably significant in warning personnel. Recovery from percent quantities in a minute or less is desirable.

4. Specificity: the instrument need not be 100% specific for a particular fuel or oxidizer since in many cases there is little chance of any other material being in the vicinity. However, common solvents, degreasing fluids, oil, gasoline, etc., should not cause an interfering signal.

"Extras" that can usually be incorporated into a detection system include

explosion-proof design, all-weather operational features, multipoint sampling methods, malfunction-indicating devices and elaborate centralized readout systems.

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RESERVE SECTION

Retirement Regulations Outlined for Reservists (concluded)

Privileges of Reservists Retired With Pay—Many service-connected privileges are accorded Reservists retired with pay. When not on active duty, they may wear the prescribed uniform of the rank or rate held on the Retired List, when the wearing of the uniform is appropriate. They are allowed to use their military titles in connection with commercial enterprises. They may be accorded the privileges of Navy Exchanges, small stores, officers' clubs, enlisted clubs, armed services exchanges and commissary stores—subject to the availability of facilities.

Members and former members who have served a minimum of 8 years of active duty (not including active duty for training) and their dependents are entitled to medical care. Information on medical care for retired Reservists and their dependents is contained in the Manual of the Medical Department, Chapter 21, and BuPers Instruction 1750.5A.

Retired personnel and their accompanying dependents may take one round trip per year—on a space-available basis—on an MSTS ship, subject to payment of the applicable MSTS charges for space-available travel. Retired Reservists and their accompanying dependents may also travel via MATS, on a standby, space-available basis.

Obligations of Reservists Retired With Pay—In addition to their many rights and privileges, retired Reservists also have certain obligations. They are, of course, subject to the regulations of the Secretary of the Navy. They may be ordered to active duty in time of war or national emergency at the discretion of SecNav, but may be ordered to active duty in peacetime only with their consent.

They are prohibited from wearing the uniform in connection with nonmilitary, personal, or civilian enterprises, or activities of a business nature. Retired personnel in an inactive duty status in a foreign country may not wear the uniform except when attending, by formal invitation, ceremonies or social functions at which the wearing of the uniform is required by the terms of the invitation or by the regulations or customs of the country involved.

All retired personnel are required to report changes of address to the

commandant of the naval district in which they reside. They must keep the Commanding Officer, U. S. Navy Finance Center (Special Payments Division), Cleveland 14, Ohio, informed of any change in mailing address.

Voluntary Retirement of Officers After 20 Years' Active Duty—Title 10, U. S. Code Section 6323 (formerly section 6 of Public Law 305, 79th Congress), provides that a Reserve officer who has completed 20 years' full-time active duty (including active duty for training) in the Navy, Marine Corps, Coast Guard, Army, Air Force, or their Reserve components, at least 10 years of which must be active commissioned service, may—upon application—be placed on the Retired List.

Retirement pay will be computed at two and one-half percent of basic pay at time of retirement, multiplied by:

Total number of years of service creditable for basic pay purposes, if on active duty continuously from 1 Jun 1958 to date of retirement (a part of a year of six months or more is creditable as a whole year); or

If the member did not serve on active duty continuously from 1 Jun 1958 to date of retirement, multiplier will be a number equal to the total number of years of service creditable for basic pay purposes as of 31 May 1958, plus the years of service credited to him after that date. (A part of a year of six months or more is creditable as a whole year.)

The pay computation is made as follows: Credit one day for each retirement point earned after 31 May 1958 and divide by 360. Try this example: Assume the Reservist's pay entry base date is 15 Sep 1940. As of 31 May 1958, he would be credited with 17 years, 8 months and 16 days. Between 31 May 1958 and his date of retirement he earned a total of 1086 retirement points through active duty and through correspondence courses, drill attendance, ACDUTRA, and so on. This total, divided by 360, equals three years and six days of service for multiplier purposes. The Reservist would thus have a total of 20 years, 8 months and 22 days to his credit. Since his partial year is more than six months, he would be credited with 21 years for multiplier purposes. His retirement pay would be figured by multiplying his basic pay at time of retirement by two and one-half percent (.025) and by 21 years. (Remember, however, that the Reservist must have spent at least 20 years on full-time active duty.)

Retirement pay may not exceed 75 percent of basic pay.

Application should be submitted six months before the desired date of retirement.

Retirement After 20 or 30 Years' Active Duty—Title 10, U. S. Code, Section 6327 (formerly Section 413, Public Law 476, 82d Congress), provides that members who have performed not less than 30 years' active duty, or who have had not less than 20 years' active duty—the last 10 of which shall have been performed during the 11 years preceding their transfer to the Retired Reserve—may be placed in the Retired Reserve upon their application.

Retirement pay under this section will be computed at 50% of the applicable basic pay of the grade in which retired.

In the event a member had previously served satisfactorily, as determined by SecNav, in a higher temporary officer grade than that held at

time of retirement, the member will be advanced on the Retired List to the higher grade, effective on the date of his retirement. In this instance, his retirement pay will be computed as outlined above for those retiring after 20 years of active duty. Any member of the Naval Reserve who meets the requirements is eligible, except that no person who was not a member of the Naval Reserve or Marine Corps Reserve on 1 Jan 1953 will be eligible for the provisions of this section. This portion of the law will terminate on 1 Jan 1973.

Applications should be submitted six months before the desired date of retirement.

Retirement of Warrant Officers After 20 Years' Active Duty—Under the provisions of Title 10, U. S. Code, Section 1293, Reserve warrant officers who have performed at least 20 years' active duty (including active duty for training) may be placed on the Retired List upon their request.

Retirement pay is computed as outlined above for retirement after 20 years' active duty. Such retirement pay may not exceed 75 percent of basic pay.

Any warrant officer in the Naval Reserve on active or inactive duty who meets the requirements is eligible.

Applications should be submitted six months before the desired date of retirement.

Additional information on nondisability retirement with pay, may be found in BuPers Instruction 1820.1B; future changes to the BuPers Manual will include this data.

The Naval Reservist - NAVPERS 15653
November 1962

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Commandants Must Be Notified of Change of Mailing Address

Whenever you move or change your mailing address, you are required to notify the holder of your official naval records of your new address.

Report address changes as follows:

Officers: To commandant holding your records. If affiliated with a pay unit, submit report via your unit CO.

Enlisted: To your CO, when affiliated with a pay unit. To commandant holding your records if you are not a member of a drill pay unit.

A temporary change of residence of six months or less does not require a transfer of records. However, if you have a temporary residence but mail cannot be delivered promptly, you should notify the holder of your records of your temporary address at the beginning and end of your temporary residence.

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New Medical-Dental Benefits for Certain Disabled Veterans

Peacetime veterans with a service-connected disability—but who are not eligible for compensation because their disability is rated at less than 10%—are now entitled to VA outpatient medical and dental treatment and to VA hospitalization.

Veterans with service-connected dental conditions must apply for treatment within one year from discharge. They are eligible for one-time dental treatment.

Those needing hospitalization for service-connected conditions will have a high priority for VA hospital care.

The new benefits are provided by Public Law 87-583.

Peacetime veterans who have no service-connected disability do not become eligible for VA medical, dental, or hospital care under the new law. Those who have been receiving compensation for service-connected disabilities were already eligible.

For more information about benefits under the new law, or to apply for VA medical, dental, or hospital care, get in touch with your nearest Veterans Administration regional office or VA hospital.

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